Project E-233-024

# PIPE FITTINGS AND VALVES
# A MANUFACTURING OPPORTUNITY IN ATLANTA

by

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September 1962

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## Foreword

Although completed as part of Georgia Tech's continuing analysis of Georgia's "best bets" for developing new industrial payrolls, this report grew out of a major program of research which the Industrial Development Division completed during the past year for the "Forward Atlanta" campaign. The extensive analysis of the Atlanta area's resources produced a broad base of information capable of generating numerous studies beyond those already published.

In addition to published and unpublished non-manufacturing materials, the Atlanta project produced a series of nine special product and industry studies prior to this one. Additional industry analyses underway either as part of Georgia Tech's continuing program or under contract with the Georgia Department of Commerce include Georgia's chemical industry potentials, synthetic rubber, a revision of an earlier electronics study, toiletries, industrial and farm pumps, pharmaceutical preparations, and papier-mache.

Inquiries regarding this or other studies completed previously or in process are welcome.

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## Summary

The manufacturers' sales of valves and pipe fittings have increased from $745 million in 1950 to over $1.3 billion in 1960.[1/] By 1967 sales for these products should exceed $1.8 billion.

In 1958 there were $86 million worth of valves and pipe fittings sold through wholesalers in the six southeastern states.[2/] Another $40 million worth were sold directly to industrial and government organizations.

Only a very small portion of the valves and pipe fittings used in the Southeast is manufactured in the area. At present the principal states producing these products are Illinois, Ohio and Pennsylvania. These three states supply 40% of the national total.

Atlanta can offer a valve and pipe fitting manufacturer the following advantages over the large producing cities in the aforementioned states:

1. Freight Savings. For a manufacturer with $3 million sales in the Southeast, annual freight costs would be $13,000 to $36,000 less from an Atlanta plant than from a plant in Chicago, Cincinnati or Philadelphia.

2. Labor Savings. The cost of production labor for valves and pipe fittings is less in Atlanta than in Chicago, Cincinnati or Philadelphia. A manufacturer with sales of $3 million can realize a labor savings of $50,000 to $158,000 over a similar operation in one of these other cities.

In addition to these cost savings, a manufacturer could capitalize on the following unique advantages of an Atlanta location:

1. Wholesale and Distribution Center. Atlanta leads all other southern cities in the wholesaling and distributing of valves and pipe fittings with an annual volume of $11.8 million.

2. Limited Local Competition. With valve and pipe fitting production limited in the Atlanta area, a local manufacturer selling to a southeastern market can offer accounts complete service and fastest delivery time possible.

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1/ Annual Survey of Manufactures, 1950-1960, U. S. Department of Commerce, Bureau of the Census.

2/ Alabama, Florida, Georgia, North Carolina, South Carolina and Tennessee.

# INTRODUCTION

## Purpose

The purpose of this study is to compare and evaluate the advantages of manufacturing valves and pipe fittings in Atlanta against manufacturing the same products in selected northern cities for consumption in the Southeast. This report is for interested valve and pipe fitting manufacturers who supply and service the southeastern market.

## Industry Characteristics

The manufacture of valves and pipe fittings is primarily suited for large plant production. In 1958 shipments valued at $1,027,700,000, or 82% of the industry total, were produced by 153 firms. Only seven of these companies are located in the Southeast.

Each of the 153 companies producing this large percentage of valves and pipe fittings employs more than 100 people, most of whom are semi-skilled labor working at either a foundry or machine shop operation.

The distribution pattern for valves and pipe fittings is straight line -- products are shipped from the manufacturer directly to the wholesaler or large industrial consumer.

## THE MARKET

### National

More than $1.3 billion worth of valves and pipe fittings were produced in the United States in 1960. This represented an annual average increase of 6% from the 1950 figure of $745 million. By using these and the intervening years as bases for a first degree projection, a forecast of more than $1.8 billion can be made for 1967 (see Figure 1).

This projection can be substantiated by relating the demand for valves and pipe fittings to nonresidential building activity. An extremely high correlation (0.940) has been found between the two during the past decade (see Appendix 1), with the annual production of valves and pipe fittings ranging from 8.6% to 11.6% of nonresidential building construction during the period.

By first degree projection, it is estimated that nonresidential building construction will exceed $22 billion in 1967 (see Figure 2). The correlation between nonresidential building activity and the production of valves and pipe fittings gives a projected demand figure of $1.88 billion[1/] worth of valves and pipe fittings in 1967 (see Figure 3).

It is reasonable to assume, therefore, that by 1967 the national market for valves and pipe fittings will be at least $1.8 billion -- possibly more.

### Southeast

The correlation between nonresidential building construction and the production of valves and pipe fittings can be used to estimate the southeastern market for valves and pipe fittings. Over 10% of the national nonresidential building is constructed in the six southeastern states.[2/] By applying this same percentage to national production figures and projections for valves and pipe fittings, it can be assumed that the southeastern market for valves and pipe fittings was more than $130 million in 1960 and will grow to at least $180 million by 1967.

A check on these figures can be made by comparing the per cent of wholesale sales in the six states to the wholesale sales nationally. There were

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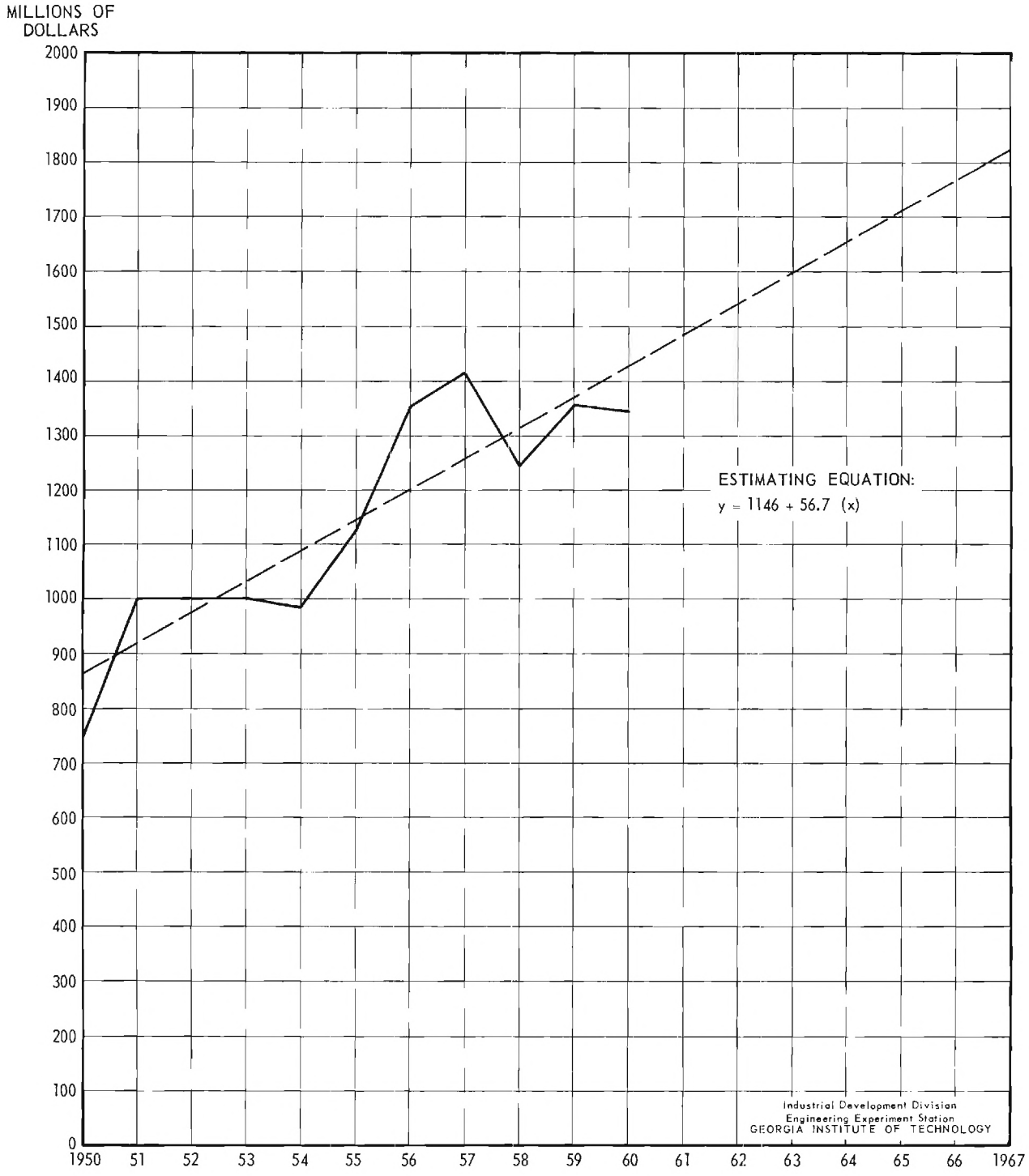
1/ Estimating equation: $x = 0.313 + 0.071y$.

2/ Alabama, Florida, Georgia, North Carolina, South Carolina and Tennessee.

FIGURE 1

U.S. PRODUCTION TREND - VALVES AND PIPE FITTINGS




SOURCE: Annual Survey of Manufactures 1950-1960

FIGURE 2

TREND OF NONRESIDENTIAL BUILDING CONSTRUCTION IN THE U.S.

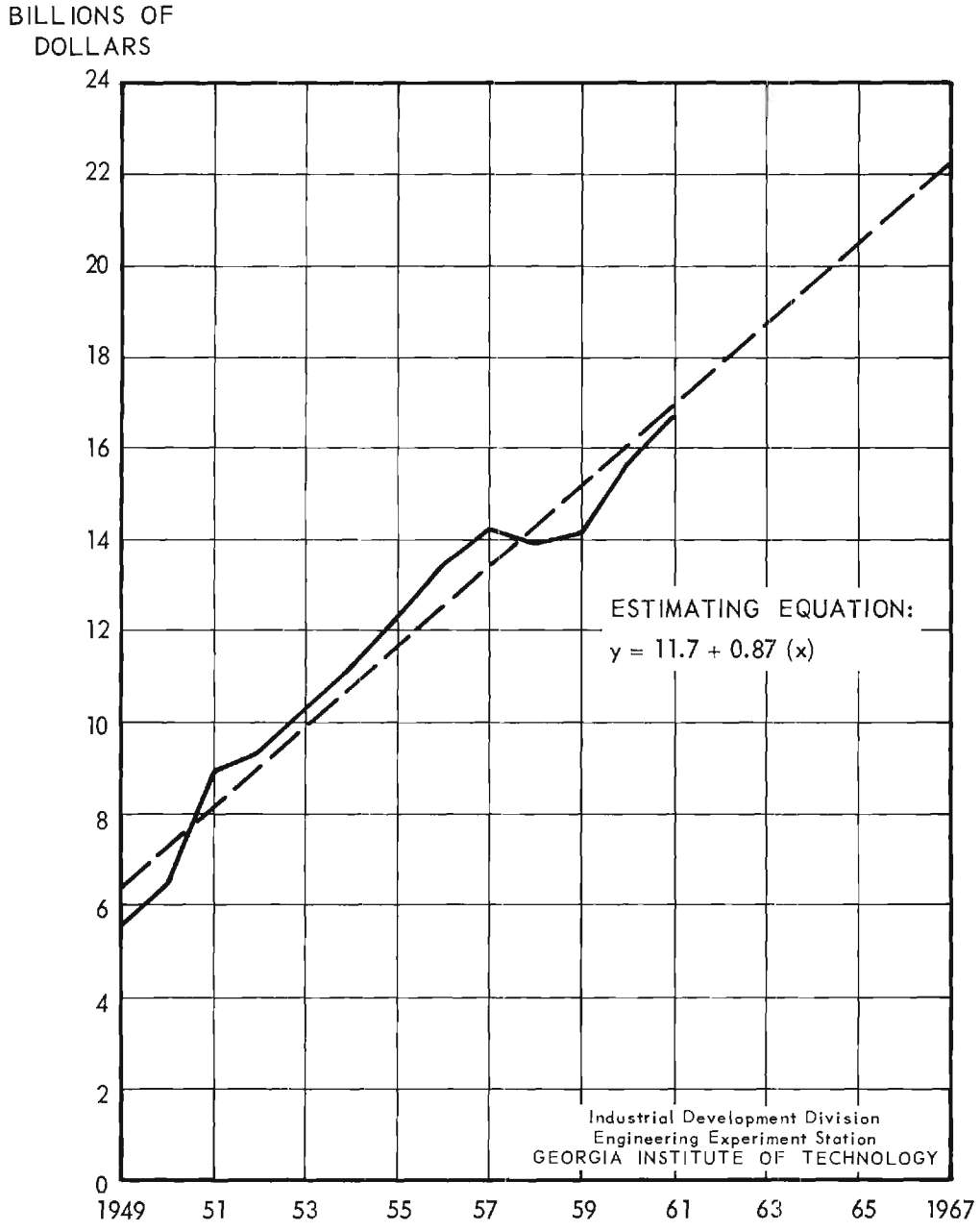
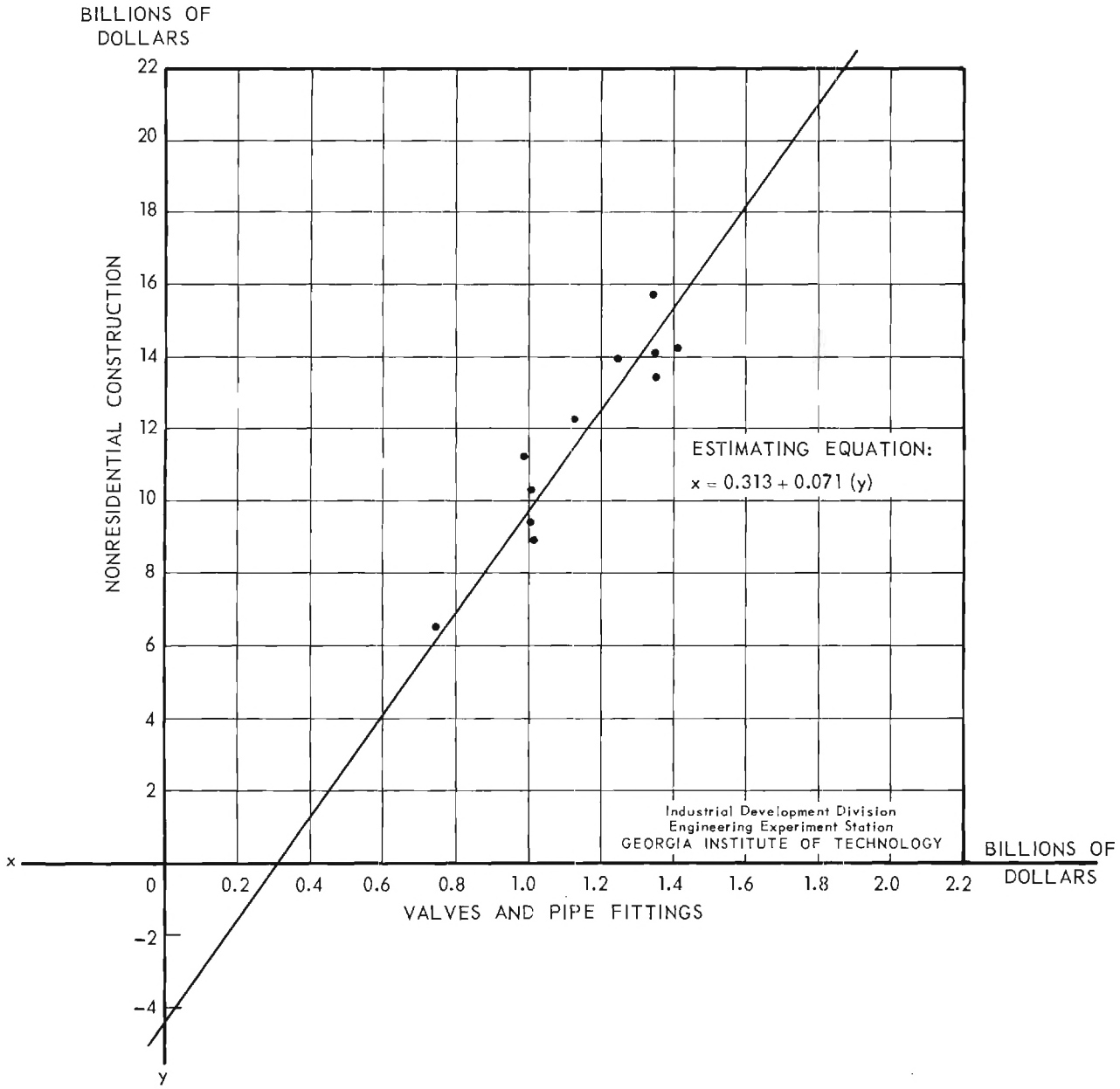


FIGURE 3

SCATTER DIAGRAM FOR VALVES AND PIPE FITTINGS
AND NONRESIDENTIAL BUILDING CONSTRUCTION BY DOLLAR VOLUME



in 1958 over $86 million worth of valves and pipe fittings wholesaled in the Southeast (see Appendix 2). This is only a part of the area's consumption, for an additional $40 million worth of these products are being sold directly to large industrial consumers and government organizations. Wholesale sales in the Southeast in 1958 were 11.5% of national wholesale sales of valves and pipe fittings. This compares favorably with the figure of 10% obtained through correlation with nonresidential building. It also indicates that sales direct to industrial users and government are probably below average in the Southeast.

It has been estimated from discussions with manufacturers' representatives that from $110 to $130 million worth of valves and pipe fittings are presently being purchased annually in the Southeast. Since only seven of the nation's 153 sizable valve and pipe fittings plants are located in the area, the bulk of the products are manufactured elsewhere and shipped to the Southeast. Even if the latter, more conservative market estimate is used, it is evident that there exists in the region a sufficiently large demand for valves and pipe fittings to consume the output of several new plants of average or even above average size in the Southeast.

Atlanta

Atlanta is one of the major wholesaling cities in the nation for valves and pipe fittings. In the wholesaling of these products Atlanta ranked twelfth nationally and first in the entire South in 1958 (see Table 1, Map 1). Sales of valves and pipe fittings by Atlanta wholesalers totaled $11.8 million in 1958 -- more than twice the volume of any other southeastern city (see Table 2, Map 2).

In addition to the wholesale trade, Atlanta is also a large distribution city for valves and pipe fittings. A number of manufacturers take advantage of Atlanta's superior transportation facilities by maintaining Atlanta warehouses to service the southeastern region.

Atlanta is strategically located in relation to a special market of major consequence. An Atlanta plant would be in a prime position to supply the many private and government organizations participating in the growing National Aeronautics and Space Administration (NASA) program.

Table 1

ANNUAL WHOLESALE SALES
OF VALVES AND PIPE FITTINGS IN PRINCIPAL U. S. CITIES

| City | Millions of Dollars |
|---|---|
| New York | 68.9 |
| Chicago | 48.9 |
| Los Angeles | 40.7 |
| Detroit | 32.2 |
| Philadelphia | 28.0 |
| San Francisco | 22.2 |
| Boston | 19.5 |
| Cleveland | 18.7 |
| Pittsburgh | 17.1 |
| St. Louis | 15.8 |
| Minneapolis-St. Paul | 13.0 |
| ATLANTA | 11.8 |

Source: 1958 Census of Business - Wholesale Trade,
U. S. Department of Commerce, Bureau of the Census.

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Table 2

ANNUAL WHOLESALE SALES OF
VALVES AND PIPE FITTINGS IN PRINCIPAL SOUTHEASTERN CITIES

| City | Millions of Dollars |
|---|---|
| ATLANTA | 11.8 |
| Memphis | 4.7 |
| Charlotte | 4.7 |
| Birmingham | 4.6 |
| Miami | 4.4 |
| Jacksonville | 3.3 |
| Tampa-St. Petersburg | 3.2 |
| Nashville | 2.8 |

Source: 1958 Census of Business - Wholesale Trade,
U. S. Department of Commerce, Bureau of the Census.

MAP 1

PRINCIPAL U.S. WHOLESALE CENTERS FOR VALVES AND PIPE FITTINGS


1 – New York
2 – Chicago
3 – Los Angeles
4 – Detroit
5 – Philadelphia
6 – San Francisco
7 – Boston
8 – Cleveland
9 – Pittsburgh
10 – St. Louis
11 – Minneapolis–St. Paul
12 – Atlanta

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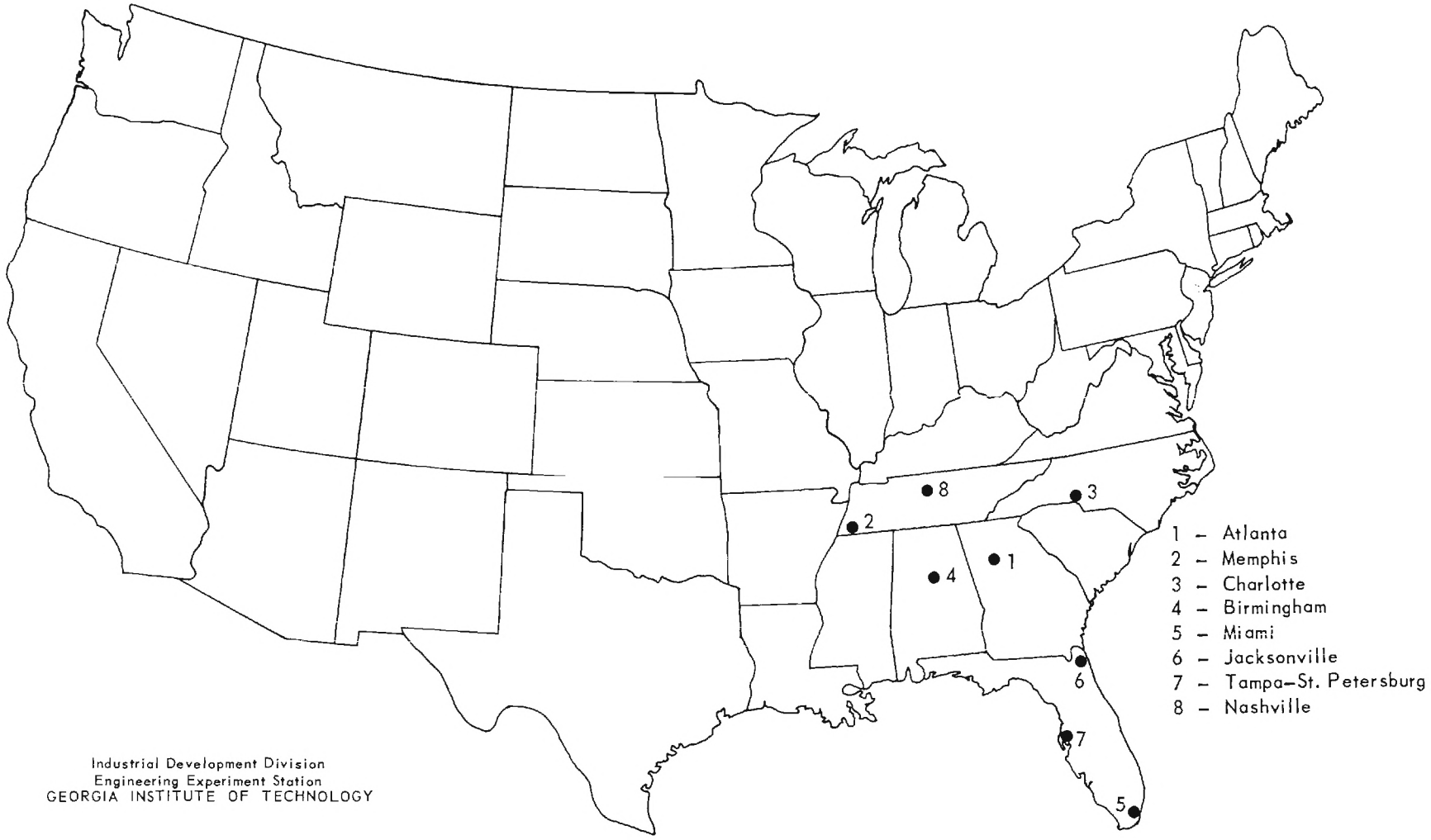
MAP 2

PRINCIPAL SOUTHEASTERN WHOLESALE CENTERS
FOR VALVES AND PIPE FITTINGS

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## ATLANTA ADVANTAGES

### Freight Costs

Over 45% of the valves and pipe fittings produced nationally are manufactured in Illinois, Ohio and Pennsylvania. Three high volume cities in these states which ship their products to points in the Southeast are Chicago, Cincinnati and Philadelphia.

An iron pipe fitting manufacturer in Atlanta can ship to the same points in the Southeast at freight rates 59.2% less than Philadelphia, 53.5% less than Chicago and 37.4% less than Cincinnati. An Atlanta manufacturer of brass valves and pipe fittings can ship at rates 53.8% less than Philadelphia, 51.8% less than Chicago and 37.4% less than Cincinnati (see Appendix 3).

This would be a savings of $230 to $264 per truckload on shipments throughout the Southeast from Atlanta instead of Philadelphia, $184 to $244 per truckload from Atlanta instead of Chicago, and $95 to $136 per truckload from Atlanta instead of Cincinnati. With a $3 million sales volume in the Southeast, an Atlanta manufacturer would save between $13,000 and $36,000 in freight costs each year. A greater freight savings would probably be realized since a large portion of these products would be shipped to wholesalers in the Atlanta area. On volume intercity shipments, commodity rates may be obtained to further increase savings.

Castings and mill shapes and forms, the raw materials needed for manufacturing valves and pipe fittings, are readily available in Georgia and surrounding states. The copper and copper-base mill forms are shipped prepaid and transportation costs are absorbed by the mill.

### Cost and Availability of Labor

The wage rate for valve and pipe fitting production workers is lower in Atlanta than in Chicago, Cincinnati or Philadelphia. In 1958 the wage rates were:[1/]

| | |
|---|---|
| Chicago | $2.71 per hour |
| Philadelphia | $2.39 per hour |
| Cincinnati | $2.35 per hour |
| Atlanta | $2.15 per hour |

1/ Census of Manufactures, 1958, U. S. Department of Commerce, Bureau of the Census.

These wage rates indicate that for the manufacturing of valves and pipe fittings labor costs in Atlanta would be 20.7% less than in Chicago, 10% less than in Philadelphia and 8.5% less than in Cincinnati.

In 1958, production wages in the valve and pipe fitting industry were 25.5% of total value of shipments in Chicago, 23.6% of total value of shipments in Philadelphia, and 19.9% of total value of shipments in Cincinnati.[1/] For a plant with shipments valued at $3,000,000, annual wage costs would be $765,000 in Chicago, $708,000 in Philadelphia, and $597,000 in Cincinnati.

The comparative labor cost savings of a plant located in Atlanta can be computed by applying to these annual wage costs the percentages by which Atlanta wage rates are lower than rates in the other three cities. An Atlanta plant with shipments valued at $3,000,000 would save approximately $158,300 annually in production labor costs over a similar plant in Chicago, approximately $70,800 over a similar plant in Philadelphia, and approximately $50,700 over a similar plant in Cincinnati.

Since over 75% of the productive labor used in the manufacture of valves and pipe fittings is in foundry and machine shop operations, a manufacturer can take advantage of the continuing abundant supply of semi-skilled labor which exists in the Atlanta area.

Atlanta has one of the lowest work stoppage rates in the nation,[2/] and numerous national metal companies with branches throughout the country indicate that absenteeism stemming from climate is near its lowest at the Atlanta plants.

Intangible in respect to monetary savings but of vital importance to plant production is the availability of technical and engineering manpower. This need can readily be satisfied in Atlanta by the Georgia Institute of Technology and Southern Technical Institute which graduate over 1,500 engineers and technicians annually.

Competitive Position

An Atlanta manufacturer of valves and pipe fittings would have limited competition in serving the regional market, since only seven competitive manufacturers with more then 100 employees are presently located in the Southeast.

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1/ Census of Manufactures, 1958, U. S. Department of Commerce, Bureau of the Census.

2/ Analysis of Work Stoppage, 1959, U. S. Department of Labor, Bureau of Labor Statistics.

Because of Atlanta's strategic location, an Atlanta producer could offer southern wholesalers and industrial consumers more complete and faster service than present major producers in the East and Midwest.

* * *

## Conclusion

There has been an ever expanding market for valves and pipe fittings in the Southeast. With an anticipated increase in nonresidential building construction and the further industrialization of the area in governmental and private programs, the demand for these products will become even greater.

A large portion of these values and pipe fittings is wholesaled and distributed in Atlanta, but only a limited volume is produced in the Southeast. An Atlanta location presents to a manufacturer of these products the advantages of:

1. freight savings,
2. lower labor costs,
3. faster delivery time, and
4. better customer service.

The freight and labor savings for an Atlanta plant with an annual output of $3 million would be between $63,000 and $192,000. This is equal to a profit on sales of 2% to 6%.

APPENDICES

APPENDIX 1

Correlation Between Valves and Pipe Fittings
and Nonresidential Construction

| Year | X | Y | $\frac{x}{(x-A)}$ | $\frac{y}{(y-A)}$ | xy | $x^2$ | $y^2$ |
|---|---|---|---|---|---|---|---|
| 1950 | 745 | 643 | -401 | -537 | 215337 | 160801 | 288369 |
| 1951 | 1017 | 890 | -129 | -290 | 37410 | 16641 | 84100 |
| 1952 | 1004 | 940 | -142 | -240 | 34080 | 20164 | 57600 |
| 1953 | 1011 | 1031 | -135 | -149 | 20115 | 18225 | 22201 |
| 1954 | 989 | 1120 | -157 | - 60 | 9420 | 24649 | 3600 |
| 1955 | 1127 | 1222 | - 19 | 42 | - 798 | 361 | 1764 |
| 1956 | 1356 | 1340 | 210 | 160 | 33600 | 44100 | 25600 |
| 1957 | 1414 | 1420 | 268 | 240 | 64320 | 71824 | 57600 |
| 1958 | 1242 | 1397 | 96 | 217 | 20832 | 9216 | 47089 |
| 1959 | 1357 | 1413 | 211 | 233 | 49163 | 44521 | 54289 |
| 1960 | 1343 | 1568 | 197 | 388 | 76436 | 38809 | 150544 |
| Total | 12605 | 12984 | | | 559915 | 449311 | 792756 |
| A (Average) | 1146 | 1180 | | | | | |

$$G_x = \sqrt{\frac{Sx^2}{N}} = \sqrt{\frac{449311}{11}} = \sqrt{40846} = 202$$

$$G_y = \sqrt{\frac{Sy^2}{N}} = \sqrt{\frac{792756}{11}} = \sqrt{72069} = 268$$

$$\text{Coefficient: } r = \frac{Sxy}{NG_xG_y} = \frac{559915}{11(202)(268)} = \frac{559915}{595496} = 0.940$$

X = Valves and pipe fittings

Y = Nonresidential construction

APPENDIX 2

Sales of Valves and Fittings in the Southeast
by Kind of Wholesaler

| Kind of Wholesaler | A (Millions of Dollars) Ala. | Fla. | Ga. | N.C. | S.C. | Tenn. | B (Millions of Dollars) | × C (Percent) | = D (Millions of Dollars) | × E (Percent) | = F (Thousands of Dollars) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Plumbing and Heating | 43.6 | 104.3 | 85.8 | 69.1 | 19.3 | 60.1 | 382.2 | 68 | 259.9 | 19.21 | 49926 |
| Hardware | 69.3 | 62.3 | 49.4 | 40.6 | 16.8 | 92.4 | 330.8 | 67 | 221.6 | 1.06 | 2349 |
| Electrical Supplies | 91.3 | 208.8 | 291.8 | 147.7 | 23.8 | 157.9 | 921.3 | 69 | 635.7 | .31 | 1971 |
| Electrical Appliances | 44.5 | 117.6 | 85.9 | 69.5 | 18.4 | 73.9 | 409.8 | 79 | 323.7 | .06 | 194 |
| Air Conditioning | 16.1 | 46.4 | 33.2 | 21.9 | 4.4 | 22.1 | 144.1 | 66 | 95.1 | .17 | 162 |
| Commercial Machinery | 42.7 | 78.6 | 66.5 | 47.8 | 18.4 | 59.6 | 313.6 | 58 | 181.9 | .12 | 218 |
| Industrial Machinery | 65.9 | 82.0 | 160.8 | 91.1 | 31.8 | 55.0 | 486.6 | 58 | 282.2 | 1.75 | 4939 |
| Industrial Supplies | 53.5 | 52.4 | 100.5 | 57.7 | 27.7 | 63.4 | 355.2 | 60 | 213.1 | 11.20 | 23869 |
| Farm and Garden Equipment | 6.8 | 18.3 | 65.5 | 33.9 | - | 66.4 | 190.9 | 64 | 122.2 | .18 | 219 |
| Transportation Equipment | 5.8 | 44.2 | 12.4 | 8.4 | - | 2.0 | 72.8 | 58 | 42.2 | .10 | 42 |
| Iron and Steel Products | 289.5 | 150.1 | 218.9 | 76.1 | - | 105.7 | 840.3 | 69 | 579.8 | .36 | 2087 |
| Non Ferrous Metals | 27.9 | 61.8 | 62.5 | 26.8 | .8 | 22.4 | 202.2 | 62 | 125.4 | .12 | 150 |
| Paint and Varnish | 4.9 | 17.4 | 26.7 | 13.8 | 3.6 | 11.7 | 78.1 | 58 | 45.3 | .05 | 22 |
| Sporting Goods | 6.1 | - | 73.6 | 19.6 | 3.5 | 36.6 | 139.4 | 59 | 82.2 | .05 | 41 |
| Construction Materials | 104.8 | 165.6 | 137.2 | 61.6 | 23.7 | 63.1 | 556.0 | 58 | 322.5 | .03 | 96 |
| Home Furnishings | 14.4 | 37.3 | 98.8 | 20.7 | 4.2 | 23.8 | 199.2 | 66 | 131.5 | .03 | 39 |
| Furniture | 10.0 | 42.6 | 17.5 | 60.7 | 7.1 | 13.8 | 151.7 | 63 | 95.6 | .03 | 29 |
| | | | | | | | | | | Total | 86353 |

A = State wholesale sales.
B = Total Southeastern wholesale sales.
C = Ratio of specified sales to total sales.
D = Sales of specified items.
E = Ratio of valves and fittings to total specified sales.
F = Valve and pipe fittings sales.

Source: Census of Business, Wholesale Trade, 1958.

Appendix 3

## METHODOLOGY USED IN DETERMINING FREIGHT SAVINGS

Eight southeastern cities with the largest wholesale volume of pipe fittings and valves were selected for the calculations in the following table on the assumption that shipments to such cities are representative of shipments to the entire study area.

Average rates from Chicago, Cincinnati and Philadelphia to the entire Southeast were obtained by allocating shipments to the various cities on the basis of each city's per cent of the wholesale volume of all eight cities.

Appendix 3

ATLANTA FREIGHT SAVINGS ON SHIPMENTS OF VALVES AND PIPE FITTINGS TO SOUTHEASTERN WHOLESALERS

IRON AND STEEL PIPE FITTINGS[1/]

| To: | From: | | | | City's Share of Shipments | Average Rates to Southeast | | | | Atlanta Savings over | Atlanta Savings over | Atlanta Savings over |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Atlanta | Chicago | Cincinnati | Philadelphia | in Per Cent | Atlanta | Chicago | Cincinnati | Philadelphia | Chicago | Cincinnati | Philadelphia |
| Atlanta | 33 | 125 | 102 | 165 | 29.9 | 9.9 | 37.4 | 30.5 | 49.3 | 27.5 | 20.6 | 39.4 |
| Birmingham | 63 | 149 | 102 | 179 | 11.6 | 7.3 | 17.3 | 11.8 | 20.8 | 10.0 | 4.5 | 13.5 |
| Charlotte | 78 | 173 | 110 | 129 | 11.9 | 9.3 | 20.6 | 13.1 | 15.5 | 11.3 | 3.8 | 6.2 |
| Jacksonville | 85 | 199 | 139 | 176 | 8.4 | 7.1 | 16.7 | 11.7 | 14.8 | 9.6 | 4.6 | 7.7 |
| Memphis | 95 | 88 | 104 | 199 | 11.9 | 11.3 | 10.5 | 12.4 | 23.7 | -0.8 | 1.1 | 12.4 |
| Miami | 123 | 267 | 168 | 221 | 11.1 | 13.7 | 29.6 | 18.6 | 24.5 | 15.9 | 4.9 | 10.8 |
| Nashville | 80 | 94 | 80 | 182 | 7.1 | 5.7 | 6.7 | 5.7 | 12.9 | 1.0 | - | 7.2 |
| Tampa | 102 | 212 | 150 | 199 | 8.1 | 8.3 | 17.2 | 12.2 | 16.2 | 8.9 | 3.9 | 7.9 |
| | | | | | 100.0 | 72.6 | 156.0 | 116.0 | 177.7 | 83.4 | 43.4 | 105.1 |

BRASS COCKS AND VALVES[1/]

| To: | From: | | | | City's Share of Shipments | Average Rates to Southeast | | | | Atlanta Savings over | Atlanta Savings over | Atlanta Savings over |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Atlanta | Chicago | Cincinnati | Philadelphia | in Per Cent | Atlanta | Chicago | Cincinnati | Philadelphia | Chicago | Cincinnati | Philadelphia |
| Atlanta | 47 | 202 | 145 | 209 | 29.9 | 14.1 | 60.4 | 43.4 | 62.5 | 46.3 | 29.3 | 48.4 |
| Birmingham | 90 | 189 | 145 | 227 | 11.6 | 10.4 | 21.9 | 16.8 | 26.3 | 11.5 | 6.4 | 15.9 |
| Charlotte | 111 | 219 | 157 | 164 | 11.9 | 13.2 | 26.1 | 18.7 | 19.5 | 12.9 | 5.5 | 6.3 |
| Jacksonville | 122 | 251 | 199 | 223 | 8.4 | 10.2 | 21.1 | 16.7 | 18.7 | 10.9 | 6.5 | 8.5 |
| Memphis | 136 | 164 | 148 | 251 | 11.9 | 16.2 | 19.5 | 17.6 | 29.9 | 3.3 | 1.4 | 13.7 |
| Miami | 176 | 300 | 240 | 272 | 11.1 | 19.5 | 33.3 | 26.6 | 30.2 | 13.8 | 7.1 | 10.7 |
| Nashville | 115 | 151 | 115 | 230 | 7.1 | 8.2 | 10.7 | 8.2 | 16.3 | 2.5 | - | 8.1 |
| Tampa | 145 | 268 | 214 | 251 | 8.1 | 11.7 | 21.7 | 17.3 | 20.3 | 10.0 | 5.6 | 8.6 |
| | | | | | 100.0 | 103.5 | 214.7 | 165.3 | 223.7 | 111.2 | 61.8 | 120.2 |

Iron and Steel Pipe Fittings

Atlanta freight savings:

over Chicago $\frac{83.4}{156.0} = 53.5\%$

over Cincinnati $\frac{43.4}{116.0} = 37.4\%$

over Philadelphia $\frac{105.1}{177.7} = 59.2\%$

Brass Cocks and Valves

Atlanta freight savings:

over Chicago $\frac{111.2}{214.7} = 51.8\%$

over Cincinnati $\frac{61.8}{165.3} = 37.4\%$

over Philadelphia $\frac{120.2}{223.7} = 53.8\%$

1/ Minimum truckload rates per 100 pounds in cents.